REVIEWS.

A Treatise on the Ligation of the Great Arteries in Continuity, with Observations on the Nature, Progress, and Treatment of Aneurism. By Charles A. Ballance, M.B., M.S. Lond., F.R.C.S., Assistant Surgeon to St. Thomas's Hospital and Joint Lecturer on Practical Surgery in the Medical School; Surgeon to the National Hospital for the Paralyzed and Epileptic, Queen Square; Assistant Surgeon to the Hospital for Sick Children, Great Ormond Street: and Walter Edmunds, M.A. Cantab., F.R.C.S., Resident Medical Officer, St. Thomas's Home. Illustrated by 10 plates and 232 figures. 8vo., pp. 568. London: Macmillan & Co., 1892.

This magnificent work, destined certainly to be a classic in its field, is a monument to the enthusiasm, perseverance, knowledge, and ingenuity of its authors, as well as the most complete and original contribution to the histology, pathology, and surgery of the arteries that has ever appeared. Small portions of the work have already been published before definite conclusions had been reached, but as a whole the book is essentially new.

Almost every possible question relating to the arteries, whether previously considered settled or not, has been most elaborately gone over by experiment and research, so that we have here the entire subject reviewed from the very beginnings of surgical teaching to the present time. To every point has been applied a wealth of experiment, and from all sources of knowledge combined have been deduced facts of the greatest practical value to the surgeon who is to ligate vessels in continuity or otherwise. Nor can the work be of less value to the histologist, pathologist, physiologist, or, in fact, to any member of the profession, no matter what may be his special field—for extensive knowledge of the blood-vessels is essential in every department of medicine, and in this volume are to be found the results of skilled research which have consumed years in their elaboration and conclusion, and which cannot be ignored by those who would be erudite and proficient in their art.

The pains at which the authors have been to arrive at the truth and the whole truth and to eliminate error are indeed remarkable; everything has the impress of as great accuracy and freedom from error as it is possible to attain by human means. Almost all their conclusions are just and apparently inevitable.

The most important points insisted upon, and, it would appear, conclusively established, are three in number: First, that ligation under all circumstances is vastly more successful where the inner coats of the vessel are not ruptured; second, that the present methods of using the ligature are totally inadequate for the larger vessels; and, third, that the formation, function, and fate of the clot have been very much misunderstood.

Each chapter has been so written that it is a thesis upon its particular caption, while the aggregate forms a complete treatise upon the entire subject. The first relates to the general subject of hemorrhage in man. It is maintained from an elaborate statistical study that general use of antiseptics has but little reduced the danger from hemorrhage after ligation of large vessels, and that the method of ligating is much more responsible for this menace than is the presence of suppuration. While it is granted that a general impression prevails that aneurisms treated by proximal ligation do well, the authors believe that this impression is totally unfounded in general, and has been originated by the frequency and success with which the superficial femoral has been ligated for aneurism. Excluding this artery, the tables show the percentage of hemorrhage still to be very high.

The value of experiments upon animals is accorded the second chapter, and their bearing as applied to similar processes in man is well elucidated. We are pleased to note the precautions taken to prevent suffering, and the universal employment of anæsthetics. It is a significant point, as bearing upon the controversy being at present carried on regarding the relative dangers of chloroform and ether, that chloroform was very early abandoned on account of frequent fatalities, while with ether practically none occurred.

Chapter III. deals with the minute anatomy of arteries and their physical attributes, from which many conclusions bearing upon practical surgery are reached.

The most important deductions from the fourth and fifth chapters, dealing with physiological and pathological occlusion of arteries, are, that in ligation rupture of the coats is not necessary for occlusion, and that where the tunics are not thus ruptured hemorrhage never occurs, even when serious pathological changes are present and in active progress.

An extensive series of experiments under head of "conduct and fate of the corpuscles of the blood after ligation" leads to the conclusion in the next chapter that "the scar tissue which occludes the artery is formed, not from the leucocytes of the blood, but from the plasma cells of the arterial wall, and that this process will take place perfectly if the vessel is simply occluded without damage to its walls."

Next succeed chapters upon the conduct and fate of the coats, and the conduct and fate of the ligature. In the latter the writers conclude that every known form of ligature except gold or platinum wire is ultimately absorbed, and that, contrary to usual belief, many animal ligatures are absorbed more rapidly in the presence of bacteria.

Chapter XI., upon suppuration after ligation, evidences the great dangers arising from suppuration in the neighborhood of a great artery, especially if the coats have been ruptured; hemorrhage, aneurism, or gangrene are then threatening possibilities; and "though it be possible that with Listerian precautions any vessel up to the size of the superficial femoral may be ligated by almost any method with success, yet this cannot be employed as an argument in favor of rupturing the coats, nor can any security which antiseptics may afford justify the practice."

In the following two chapters the pathology of hemorrhage and the conduct and fate of the aneurism receive elaborate consideration.

Chapter XVI. is devoted to the very practical question of the choice of the ligature. Here the selection of the writers, very guardedly reached, is, in order of preference, ox peritoneum, kangaroo tendon, boiled floss silk, or, failing these, Chinese twist, chromic catgut, or silkworm-gut. They have found that chromic catgut will last long enough for the purpose if suppuration does not intervene, but that in the latter case absorption is dangerously rapid owing to the working of cells into its interstices. Fine silk boiled in 1 to 500 bichloride of mercury solution is by them perferred for ordinary daily use instead of catgut.

The following division relates to the choice of the knot. Contrary to general supposition, it is here clearly proved that the reef knot can be, and frequently is, converted into a slip knot by even slight irregular traction on the ends of the ligature before the second tie is made. It is also demonstrated that in ligating large vessels the surgeon's knot cannot be so tied that the first tie will not loosen before the second is brought down upon it except when the first is made so tight as to rupture two or more coats of the artery—the one point above all others that this book is intended to show should never be done. All sorts of knots were extensively experimented with, and proved unsatisfactory for one cause or another, except one, termed by the authors the "stay knot." This—the one recommended—is made by passing two or more strands of large-size ligature about the vessel so that they shall lie side by side. The first tie of a reef or surgeon's knot is then made in each successively, and all the ends pulled upon together at each side until the vessel is sufficiently occluded. The second tie of the knot is made by bunching all the strands on each side, and tying down the second knot as if each bunch was a single strand. Experimentally, these knots were found to possess manifold advantages over all others for the larger vessels; but it is also shown that the knot, as well as the ligature material, is almost a matter of indifference in dealing with vessels smaller than the superficial femoral.

Suggestions and conclusions as to the force necessary to occlude yet not rupture the inner coats of arteries occupy Chapter XVIII.; ligation experiments, Chapter XIX.; and the conduct of the operation and fate of the patient, the twentieth and final chapter. In the latter the operative method of ligating the larger arteries is very well described and illustrated, but little original matter appears. Three appendices follow, devoted respectively to the subjects of "Blood Pressure in Aneurisms," "Blood Currents in Aneurisms," and the "Choice of the Antiseptic." Bichloride of mercury is the antiseptic chosen as best in performance of the operation of ligation. A copious list of authorities and a good index conclude the work.

Exceptionally profuse and beautiful illustration is a marked and pleasing feature of this book. The plates and cuts attest the remarkable skill and accuracy of the artist, Mr. Lapidge, who has worked them out in an unusually brilliant manner. Typographically the volume is also exceptionally beautiful and up to highest standard.

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